



Biology Toolkit: Indicator 1.4.3

Student Handout: Biology: Indicator 1.4.3

Goal 1.0 Skills And Processes

Expectation 1.4 The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.

Indicator 1.4.3 The student will use experimental data from various investigators to validate results.

Public Release - Selected Response Item - Released in 2006

Biology Indicator 1.4.3

Use the technical passage "[The Good, The Bad, The Zebra Mussel](#)" to answer the following:

A scientist was testing the hypothesis that zebra mussels cause a decrease in the population of bluegill, a type of fish. The mussels feed on copepods, a type of plankton that is also eaten by bluegill and other fish. In an experiment, he counted the number of bluegill and the number of copepods in an aquarium containing one kiloliter of water. He then added zebra mussels. After two weeks, and again after four weeks, he counted the copepods, bluegill, and zebra mussels. Which set of experimental data supports his hypothesis that the number of bluegill decline because zebra mussels eat copepods?

A.

B.

C.

D.

Correct Answer

C.

Item

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Handouts

THE GOOD, THE BAD, THE ZEBRA MUSSEL

Dreissena polymorpha, the zebra mussel, is a species of mussel that is native to East European waterways. Before their discovery in the Great Lakes region in 1988, zebra mussels were unknown in North America. They were probably brought in by ships traveling to the Great Lakes. By 1998, zebra mussels had spread to the lakes and streams of 12 states.

Zebra mussels have an impact on an ecosystem soon after they colonize a waterway. Their larvae spread rapidly, settling on almost any available surface. They quickly establish large colonies. Zebra mussels compete with native freshwater mussel populations so effectively that the native mussel populations quickly decline or totally disappear.

In a study of Lake Erie, researchers noted that just two years after the first zebra mussels colonized the lake, the water in the lake was six times clearer. Because mussels feed on plankton, the basis of the lake's food chain, they had reduced the plankton population by 80%.

The greater clarity of the water allowed light to reach greater depths. This resulted in increased growth of aquatic plants. Pollution inhibited the growth of some of these plants in the past, but when pollution decreased in Lake Erie and the water became clearer, the plants flourished, providing cover and nurseries for some types of fish.

Zebra mussels filter large amounts of water through their bodies. Researchers estimate that zebra mussels filter a large percentage of the water in Lake Erie every week. As they filter the water, they remove toxic chemicals and pollutants like PCBs. PCBs accumulate in the fatty tissues of organisms. Because of their ability to filter water and their high body-fat content, zebra mussels build up more than ten times the amount of PCBs and other toxic contaminants from the water than the native mussels. Some birds and fish absorb these contaminants when they feed on the zebra mussels. The contaminants are then passed up the food chain.

Scientists have studied the short-term effects of zebra mussel invasions on the ecology of North American waters. However, scientists will need to conduct additional studies to determine the long-term effects of these invasions.